



U.S. Department of Transportation
Federal Highway Administration

MATC
MOBILE ASPHALT TECHNOLOGY CENTER

2026 PAPA/PennDOT Asphalt Pavement Bus Tour

State College, PA
July 28-29, 2026

Unless otherwise noted, FHWA is the source for all images in this presentation.

*To learn more about the MATC
Program visit the website:*



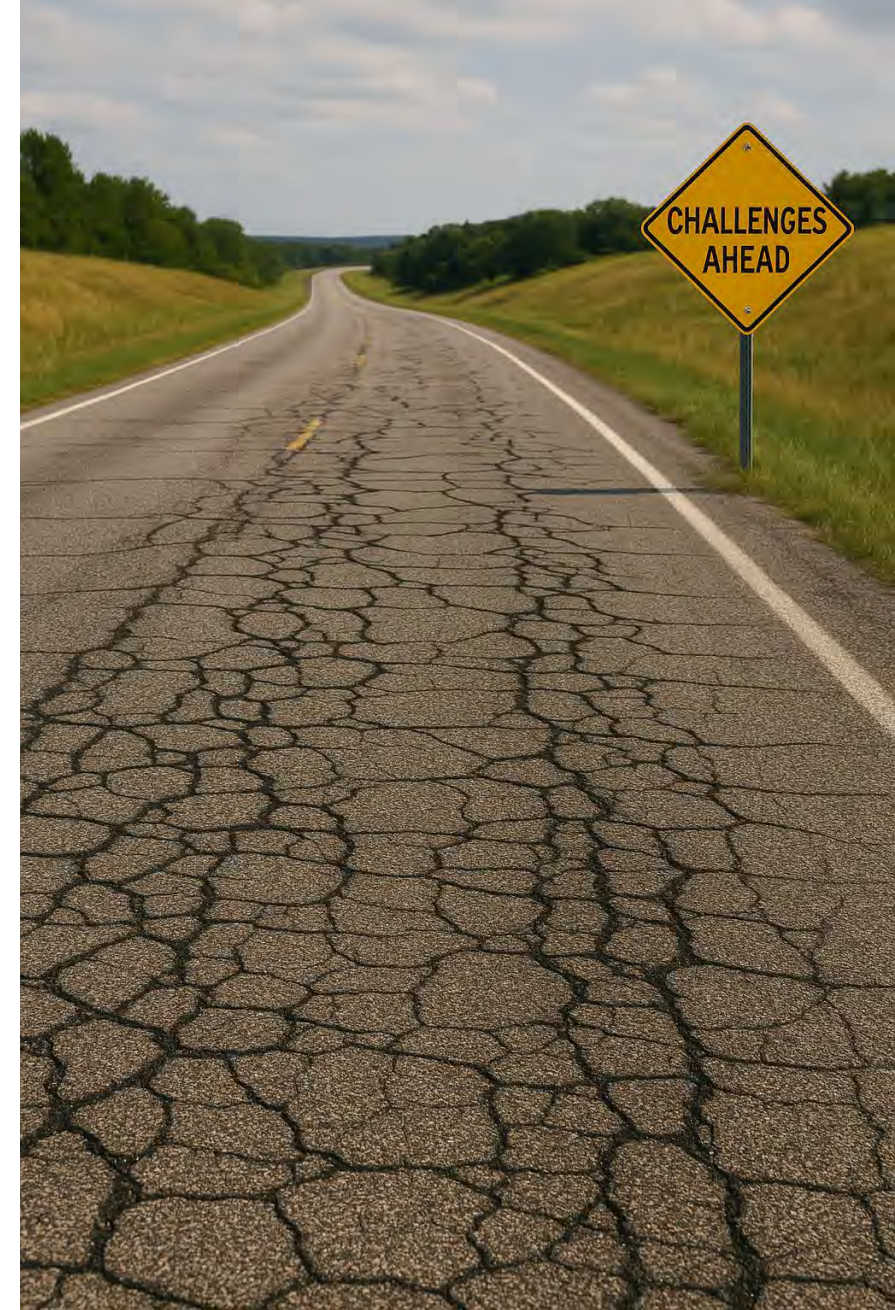
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Today's Challenges

- ▶ Durability shortfalls
- ▶ Recycled materials
- ▶ Climate resilience
- ▶ Binder supply and modification
- ▶ Workforce
- ▶ Funding versus needs
- ▶ Cost effectiveness
- ▶ Safety
- ▶ Others...



FHWA Mobile Asphalt Technology Center

2025

- ✓ Georgia
- ✓ Iowa
- ✓ Maine
- ✓ Michigan

2026

- ✓ New Mexico
- ✓ Nevada
- ✓ Utah
- Indiana
- Nebraska

2027

Pennsylvania?

search



What Does The MATC Do?

- ▶ Showcase new & under-utilized asphalt technologies
- ▶ Demonstrate benefits of strong specifications in quality assurance (QA) programs
 - Agency acceptance
 - Contractor quality control (QC)
- ▶ Encourage advancements and assist with
 - Specifications
 - Technical assistance
 - Training
 - Troubleshooting
- ▶ Demonstrate tools for
 - Contractors to work more efficiently and effectively
 - Agencies to make better acceptance decisions



Testing Technologies Demonstrated

Mixture

- ▶ Volumetric Analysis
- ▶ Balanced Mix Design Testing
 - ▶ IDEAL-CT
 - ▶ Overlay Test
 - ▶ I-FIT
 - ▶ IDEAL-RT
 - ▶ HWTT



Binder

- ▶ Intermediate temperature parameters for fatigue
- ▶ ΔT_c
- ▶ X-ray Fluorescence (XRF) Spectrometer
- ▶ FTIR Spectrometer
- ▶ Automated Extraction



Field

- ▶ Paver-Mounted Thermal Profiler (PMTF)
- ▶ Pulse Induction Technology (PIT)
- ▶ Pavement surface texture measurements
- ▶ Dielectric Profiling System (DPS)



Areas of Focus

- ▶ Balanced Mix Design
- ▶ Increasing recycled materials usage
- ▶ Highly-modified asphalt binders
- ▶ Means to measure quality of asphalt mixture and in-place pavement
- ▶ Tools for improved Quality Control by contractors
- ▶ Others



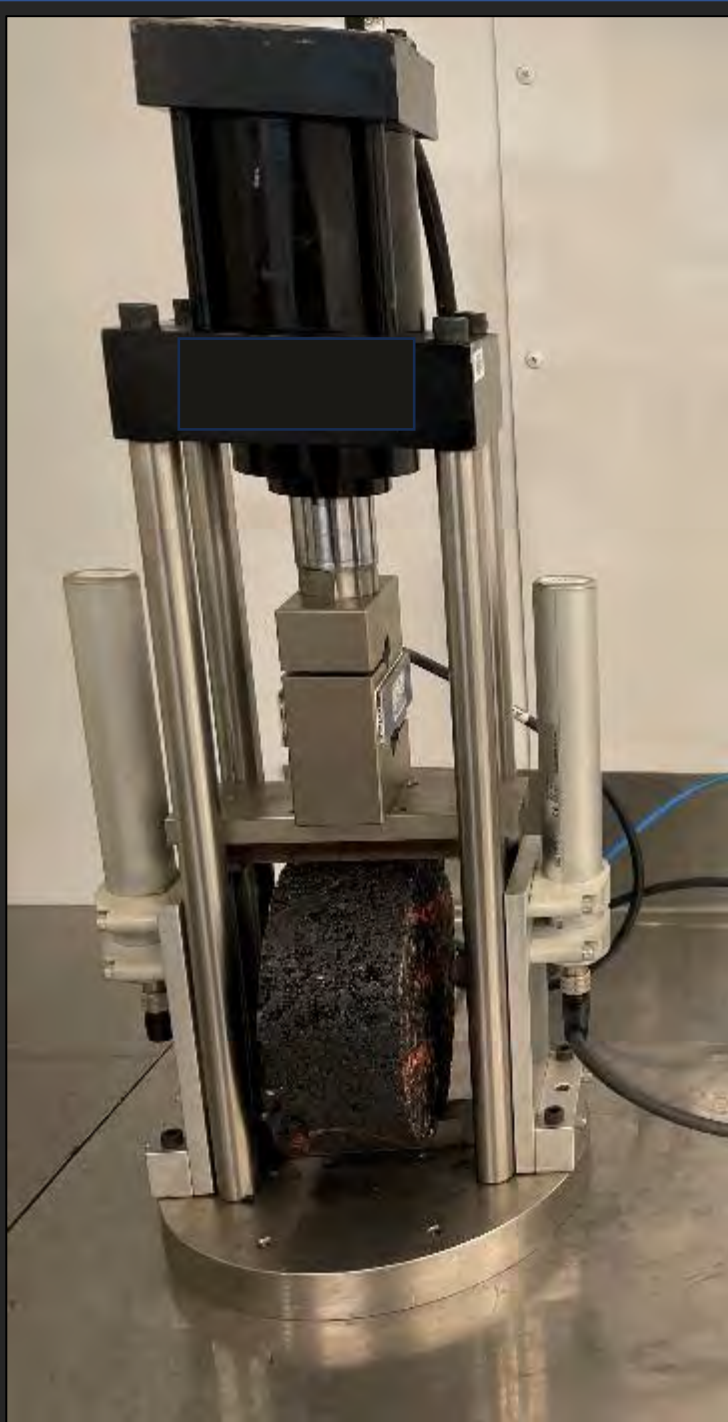
What is Balanced Mix Design (BMD)?

- ▶ *“An asphalt mixture design framework using mechanical tests correlated to field performance on appropriately conditioned specimens that address multiple modes of asphalt layer distress taking into consideration mixture aging, traffic, climate, and location within the pavement structure.”*

Design
"philosophy"
optimize mix
performance
against distresses
pertinent to climate
& traffic specific
where it will be
placed.

What has changed?

The advent and popularization of mechanical tests for the asphalt mixture related to common distresses.

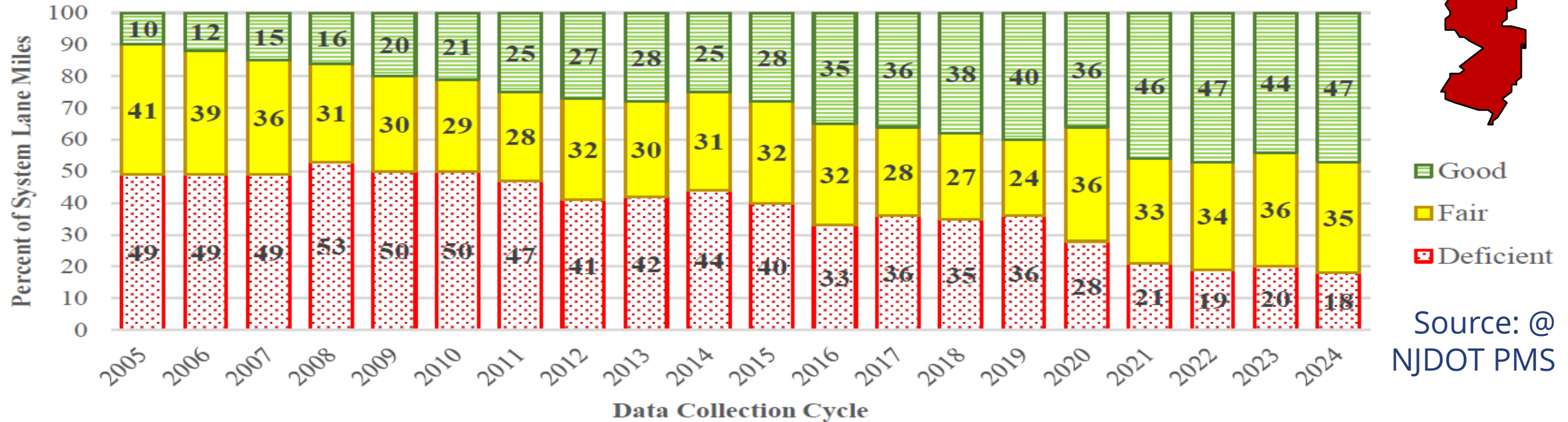


Why Change? Benefits of BMD

- ▶ Many acknowledge that all mixes behave differently, and current design procedures may not be optimizing performance using volumetrics alone
- ▶ Has potential to provide several benefits to the asphalt community if successfully implemented:
 - Enhanced quality and longevity
 - Stronger tie between design elements and field performance
 - Mixes using more alternative and recycled materials
 - Industry innovation to meet performance needs



Why Change? Benefits of BMD



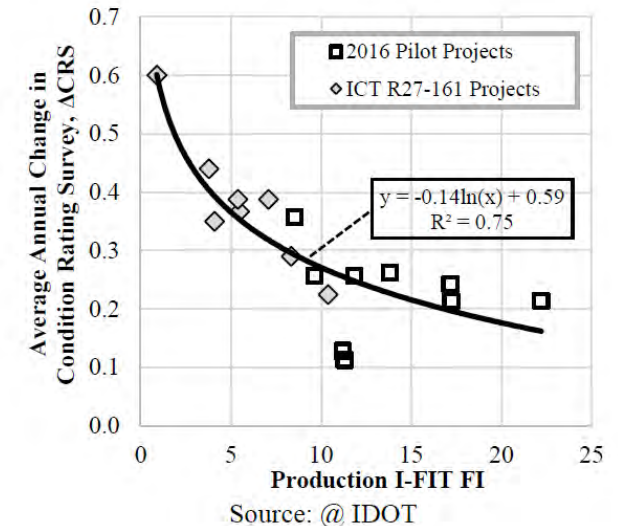
Longer-Lasting Treatments: HPTO (~10 yrs, 1 in.) & BRIC+SMA (>15 yrs) outperform traditional Superpave overlays.

Validated, Cost-Efficient Performance: Thinner BMD overlays treat more lane-miles per dollar; IDEAL-CT correlates with field cracking (reinforcing NJDOT's 2023 decision to transition to surrogate tests for production acceptance).

Why Change? Benefits of BMD

Illinois

- ▶ Cracking resistance is directly linked to field performance
- ▶ Increasing I-FIT FI from 3 to 8 reduces pavement deterioration rates for IDOT by 31%.
- ▶ BMD improved service life & slowed deterioration



Virginia

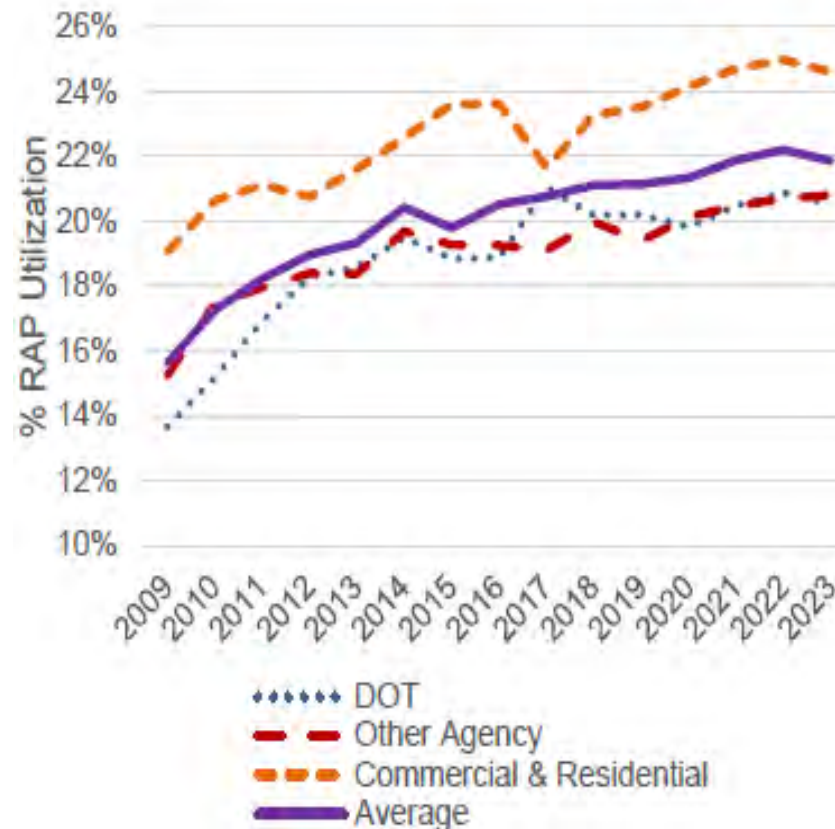
- ▶ Focused first on dense-graded, non-polymer surface mixtures to achieve a large program impact.
- ▶ Expanded from pilot projects into maintenance resurfacing contracts and statewide use for key surface mixes.

Benefit estimate
>\$6.8M/year deferred
paving costs
from higher CTIndex
target

Recycled Materials Usage

- ▶ Use can conserve resources and energy – reduce costs
- ▶ Challenges due to stiffness and additional fines
- ▶ Successful practices:
 - Pick the right project
 - Binder **quality**
 - Binder **quantity**
 - Strong construction and quality assurance

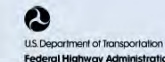
Data from 2023 NAPA Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage



TechBrief

The Asphalt Pavement Technology Program is an integrated national effort to improve the long-term performance and cost-effectiveness of asphalt pavements. Managed by the Federal Highway Administration through partnerships with State highway agencies, industry, and academia, the program's primary goals are to reduce congestion, improve safety, and foster technology innovation. The program was established to develop and implement suggestions, methods, procedures, and other tools for asphalt pavement materials selection, mixture design, testing, construction, and quality control.

Office of Preconstruction, Construction, and Pavements
FHWA-HIF-22-003
Date: July 2021



Resource Responsible Use of Reclaimed Asphalt Pavement in Asphalt Mixtures

This Technical Brief summarizes techniques employed by State DOTs in the use of high dosages of reclaimed asphalt pavement (RAP) in asphalt mixtures and communicates the benefits observed.

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Introduction

Reclaimed asphalt pavement (RAP) has been used in asphalt pavement rehabilitation and reconstruction for decades. However, since the 2008 peak in asphalt binder price, the desire to increase the use of RAP has continued (1). It has been driven by the goal for cost-effective alternatives to virgin asphalt binder and the desire to make asphalt pavements more sustainable. However, this has created challenges for some State Departments of Transportation (DOTs) to specify, design, and control the quality of asphalt mixtures containing RAP. Other State DOTs have had success with varying RAP dosages. The primary concern is ensuring that the high stiffness RAP binder in the mixture does not lead to long-term pavement durability issues such as raveling and cracking.

According to the National Asphalt Pavement Association (NAPA), the amount of RAP accepted/delivered to asphalt mixture producer facilities in 2019 was 97.01 million tons, and the RAP used in asphalt mixtures was 89.2 million tons (2). More than 97 percent of asphalt mixture reclaimed from old asphalt pavements was used in new pavement. Since 2009, the average percentage of RAP used in asphalt mixtures by weight has increased from 15.6 percent to 21.1 percent. All State DOTs allow the use of RAP at some dosages and conditions.

Benefits and Risks of Using RAP

Positive, sustainable benefits (cost, environmental and societal) have been documented by NAPA, and State DOTs have embraced the use of RAP (2). Based on a review of a national literature summary including individual State DOT and Long Term Pavement Performance (LTPP) program data compiled for the 2011 FHWA Report No. FHWA-HRT-11-021

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Highly-Modified Asphalt Binders



- ▶ Highly-modified asphalt (HiMod / HP asphalt) uses a more highly polymer-modified binder to create a more elastic, durable pavement system than conventional asphalt.
- ▶ Best fit for high-stress locations such as heavy traffic, slow-moving traffic, intersections, bridge approaches, and other areas prone to early distress.
- ▶ Improved resistance to rutting, fatigue cracking, reflective cracking, and raveling, with better long-term durability.
- ▶ Helps deliver longer service life and may allow thinner asphalt sections in some applications while maintaining performance.



New Means of Measurement for Quality

- ▶ More tools that provide continuous measurement
 - Temperatures
 - In-place density
 - Others



Major MATC Activities

Site Visits



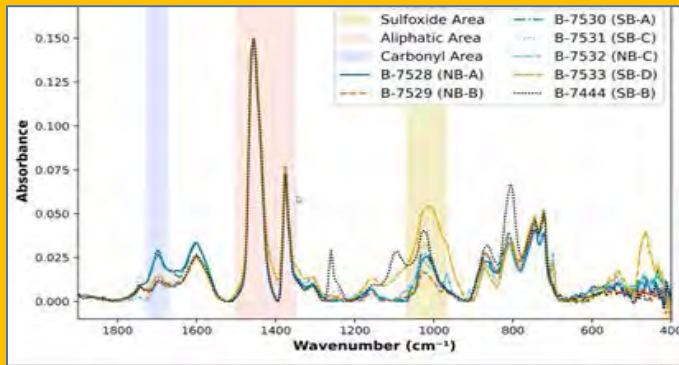
Training & Workshops



Equipment Loan



Technical Assistance



Information & Data



Note: Activities are tailored based on agency priorities, projects, materials, and available staff.

MATC Site Visits: Typical Overview

- ▶ Week 1 - MATC Open House at UDOT District Office in Hurricane, UT – June 3rd
- ▶ Week 2-3 MATC setup at the UDOT Offices in Salt Lake City
- ▶ **Mixture/Asphalt Binder sampling and testing from two HiMod projects as per test plan**
 - Mixture Performance Testing Comparison:
 - HiMod Mix A
 - HiMod Mix B
- ▶ **Field Testing Technologies**
 - Dielectric Profiling System (DPS)
 - Paver-Mounted Thermal Profiler (PMTP)
 - Laser Texture Scanner (LTS)
 - Pulse Induction Technology (PIT)

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	6/1/2026	6/2/2026	6/3/2026	6/4/2026	6/5/2026
Trailer	MATC Travel/Set Up to Hurricane UT		Open House 8-9AM MATC Tours 9AM-12PM	MATC Travel to Taylorsville UT	
Public Events Meetings	None Scheduled			None Scheduled	On-Site Kickoff Meeting
Week 2	6/8/2026	6/9/2026	6/10/2026	6/11/2026	6/12/2026
Trailer	MATC Set Up	Open House 10AM-12PM MATC Tours 1-3PM	Sample Collection – Specimen Fabrication – Volumetrics/Performance Testing		
Public Events Meetings	None Scheduled		Asphalt 101 8AM-4PM	Trailer Tours ** Field Technology Demo Day*	
Week 3	6/15/2026	6/16/2026	6/17/2026	6/18/2026	6/19/2026
Trailer	Volumetrics/Performance Testing (continued)/Analysis/Discussion w/UDOT				Trailer Breakdown
Public Events Meetings	Trailer Tours**		Field Technology Demo Day*		On-Site Closeout Meeting*

* Dates to be Determined **Scheduled on an as needed basis

MATC Site Visits: Arkansas Example

- ▶ Visit in March 2024
- ▶ Introduced BMD and multiple field technologies to ARDOT and industry
- ▶ Provided technical assistance on multiple topics: ignition furnace testing, BMD, etc.
- ▶ Specification review provided potential improvements to statewide practices
- ▶ “The visit significantly increased confidence among ARDOT staff and industry partners, accelerating the transition from prescriptive specifications to performance-based frameworks.”



MATC

Asphalt 101

1-day Course



1-day Free Course on Asphalt Materials and Construction

- ▶ Introduces basic concepts and practices to improve quality for asphalt paving
- ▶ Scheduled typically before the Open House for a site visit
- ▶ Offered as part of a MATC site visit and can be held virtually or in person
- ▶ Also offered periodically virtually for all to attend

Audience: People who have little to no background in asphalt materials and construction

After We've Gone...

► Deployment

- *2-Day Quality in the Asphalt Paving Process Workshop*
- Recorded video briefs

► Troubleshooting

- Onsite: within scope of standard or agency specification
- Ongoing technical assistance from the FHWA Resource Center on the Asphalt Binder and Mixture Testing

► Post-Construction Evaluation

- Non-destructive testing for construction monitoring
- Pavement surface characteristics



MATC - Other Training Opportunities



Other training deliveries available with a site visit by request, for example:

- ▶ Balanced Mix Design (BMD) fabrication training for technicians
- ▶ Asphalt mixture volumetrics basics and refresher
- ▶ Balanced Mix Design 101
- ▶ Quality control effective practices
- ▶ Virtual Lunch & Learn sessions on various topics of interest (High-RAP, BMD, In-Place density, etc.)

Equipment Loan Program

- ▶ Borrow latest asphalt testing and field technologies (e.g. PMTP, texture scanners, XRF) at no cost for limited trial period
- ▶ Short-term loans (typically ~2 months) so you can use the equipment on *your* projects, with MATC support for set-up, training, and data interpretation

- **Try before you buy** - Use MATC equipment on *your* projects and materials to see if a technology truly works before committing capital or changing specs.
- **Make smarter investments** – Use lessons learned from the loan (performance, usability, staffing needs) to shape future purchases, training, and implementation plans.

Equipment Loan Program - Technologies

Current Technologies Available for Loan

- ▶ Paver-Mounted Thermal Profiler (PMTP) units
- ▶ Circular Track Meter (CTM)
- ▶ Laser Texture Scanner (LTS)
- ▶ Handheld XRF Spectrometer
- ▶ SmartJig for IDEAL-CT
- ▶ Jig sets for IDEAL-RT, I-FIT and Overlay Test (OT)
- ▶ Pulse Induction Technology
- ▶ Others?



U.S. Department of Transportation
Federal Highway Administration



MATC
MOBILE ASPHALT
TECHNOLOGY CENTER

EQUIPMENT LOAN PROGRAM

In order to increase the likelihood of adoption of new technologies, the FHWA's Mobile Asphalt Technology Center (MATC) provides loans of laboratory and field equipment to the asphalt pavement community.

Why borrow from FHWA? Providing the opportunity for members of the asphalt paving community to trial technologies and test procedures can significantly increase the likelihood of adoption. By borrowing equipment, agencies and contractors don't have to front the resources to buy an expensive piece of equipment, only to potentially find that it may not meet their needs.

The standard equipment loan duration is limited to 2 months. Depending on both the need and current equipment availability, loan durations can often be extended upon request.



EQUIPMENT AVAILABLE FOR LOAN

- Paver-Mounted Thermal Profiler (PMTP) for mat temperature
- Pulse Induction Technology for mat thickness
- Circular Track Meter (CTM) and Laser Texture Scanner (LTS) for surface macrotexture
- SmartJig (with software) and other loading jigs for various balanced mixture design testing: IDEAL-CT, IDEAL-RT, Illinois Flexibility Index Test (I-FIT), and Overlay Test (OT)
- X-ray Fluorescence Spectrometer (XRF) for determining the elemental composition of asphalt binders



In order to obtain additional information on the equipment listed above, please see the MATC website at

[HTTPS://WWW.FHWA.DOT.GOV/PAVEMENT/ASPHALT/MATC/EQUIPMENT-LOAN-PROGRAM.CFM](https://www.fhwa.dot.gov/pavement/asphalt/matc/equipment-loan-program.cfm)

Equipment Loan Program - Process



Each Loan Includes the Following:

- ▶ Pre-Loan virtual meeting
- ▶ Training by MATC
- ▶ Mid-Loan period check-in
- ▶ Assistance with data extraction & analysis
- ▶ Post-Loan virtual briefing to go over results & describe your experience with the technology
- ▶ “Lessons Learned” document (for some loans)
- ▶ Return borrowed equipment to FHWA

Federal Highway Administration
Office of Preconstruction, Construction, and Pavements
FHWA Mobile Asphalt Technology Center (MATC)

Equipment Loan Request

Requester Name:

Organization:

Email Address:

Phone Number:

Shipping Address:

Equipment Requested:

Start/End Date Desired:

Please briefly describe your intent for the equipment that you are borrowing from the MATC:

ACTION ITEMS
1: Please email the completed form to Otto Arrieta
2: Please copy the following individuals in your email

EMAIL ADDRESSES
otto.arrieta.ct@dot.gov
FHWA-MATC@dot.gov, michael.huner.ct@dot.gov, and your local FHWA Division Office Pavement & Materials Contact

Upon receipt of this form, the MATC will review the request and contact you to set-up a meeting to discuss the potential loan. All loans are subject to the availability of equipment.
If you have any questions, please reach out to the MATC at FHWA-MATC@dot.gov

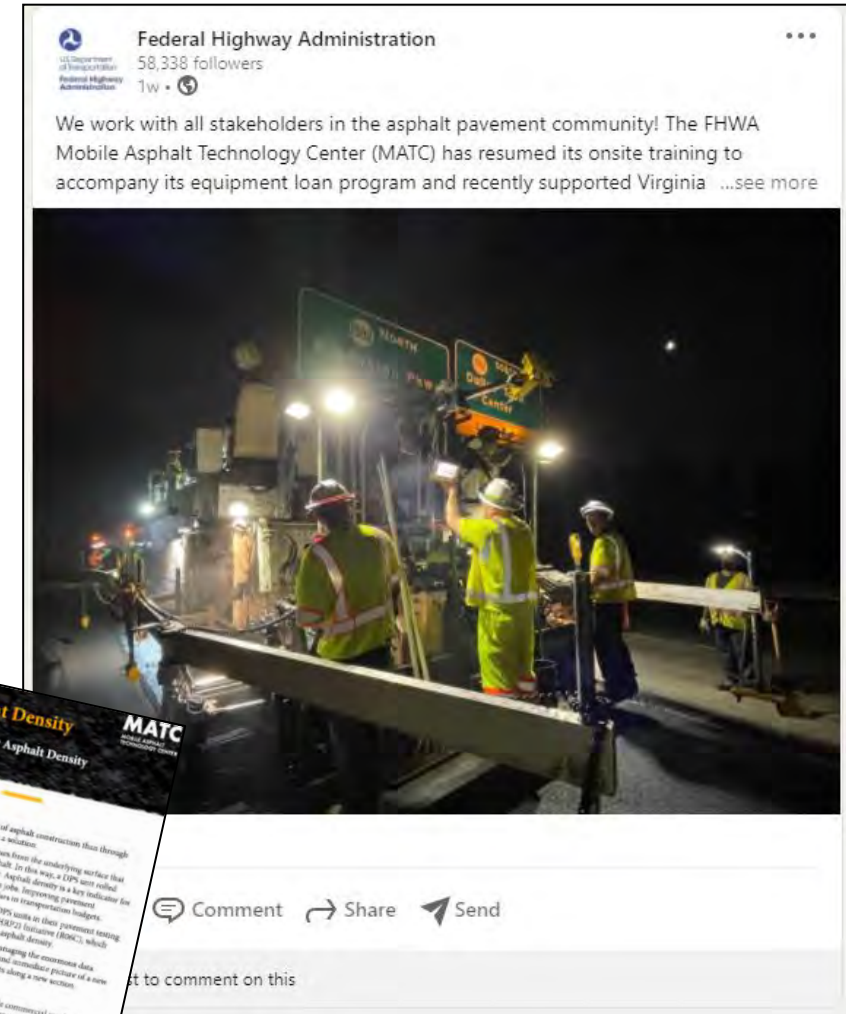
Technical Assistance / Specification Review

- ▶ MATC staff are here to help with;
 - Balanced Mix Design,
 - RAP usage,
 - specialty mixtures,
 - acceptance specifications,
 - etc.
- ▶ Specification review for owner agencies – feedback based upon nationwide experience
 - Independent feedback for ways to improve clarity, quality, and effectiveness of specifications
 - Address pain points



Technology Transfer

- ▶ Follow FHWA MATC efforts on social media (LinkedIn / Facebook)
- ▶ Technical Documents:
 - Enhancing in-place density series
 - Spotlight on Pavement Density: Dielectric Profiling System Series
 - Spotlight on Constructability: Paver-Mounted Thermal Profiler Series
 - Spotlight on Pavement Safety



MATC

MOBILE ASPHALT TECHNOLOGY CENTER

**SPREADING ASPHALT PAVEMENT
TECHNOLOGY INNOVATION**

<https://www.fhwa.dot.gov/matc>

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